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Southern Everglades Best Management Practices Program Annual Update

*Governing Board Meeting – August 11, 2016
Pamela Wade, P.E., Bureau Chief, Everglades Regulation*

Water Quality Improvement Strategies

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**Regional Projects
Stormwater Treatment Areas**



**Restore the
Everglades**



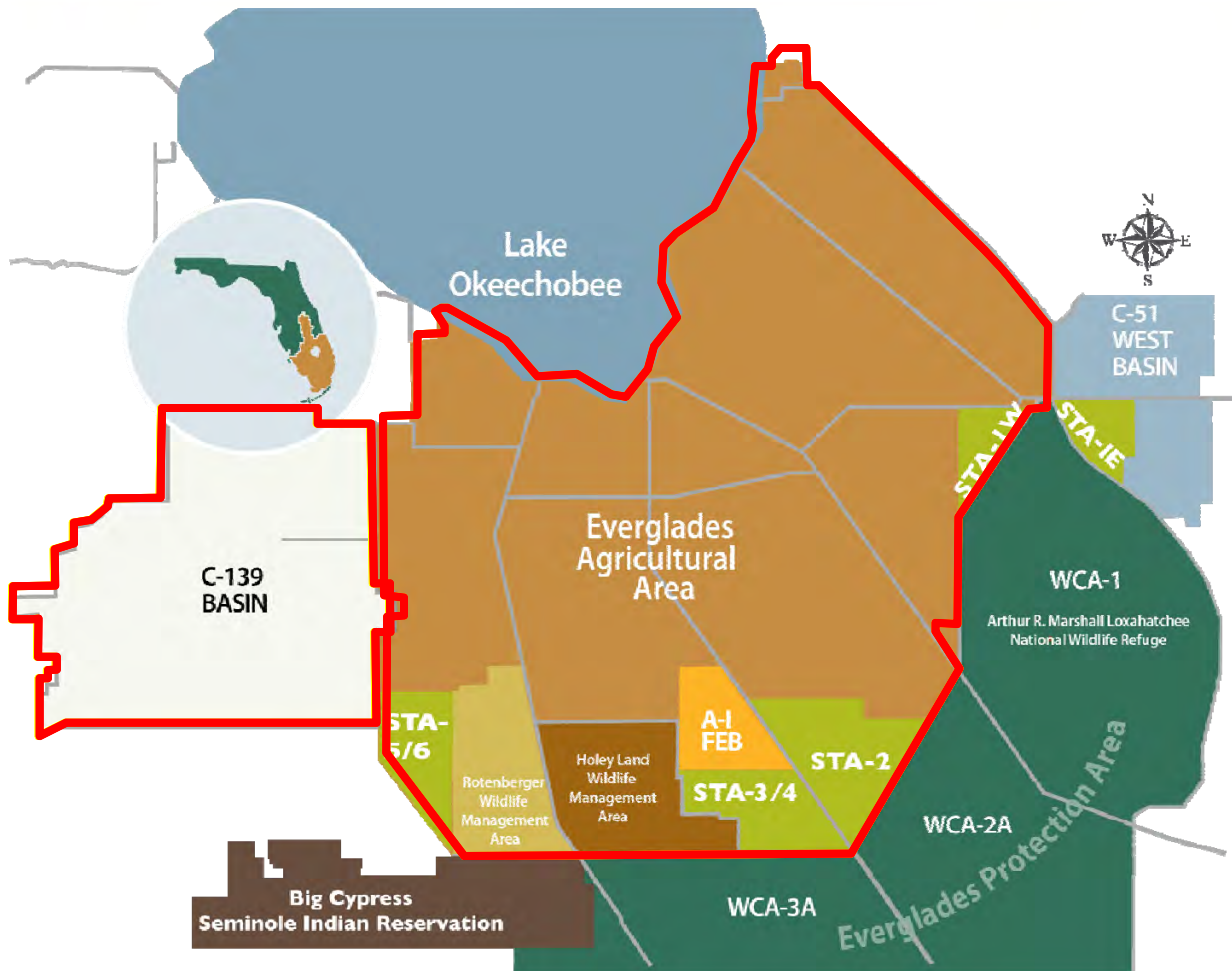
**Regulate Activities at Source
Best Management Practices**





Everglades Agricultural Area (EAA) and C-139 Basins

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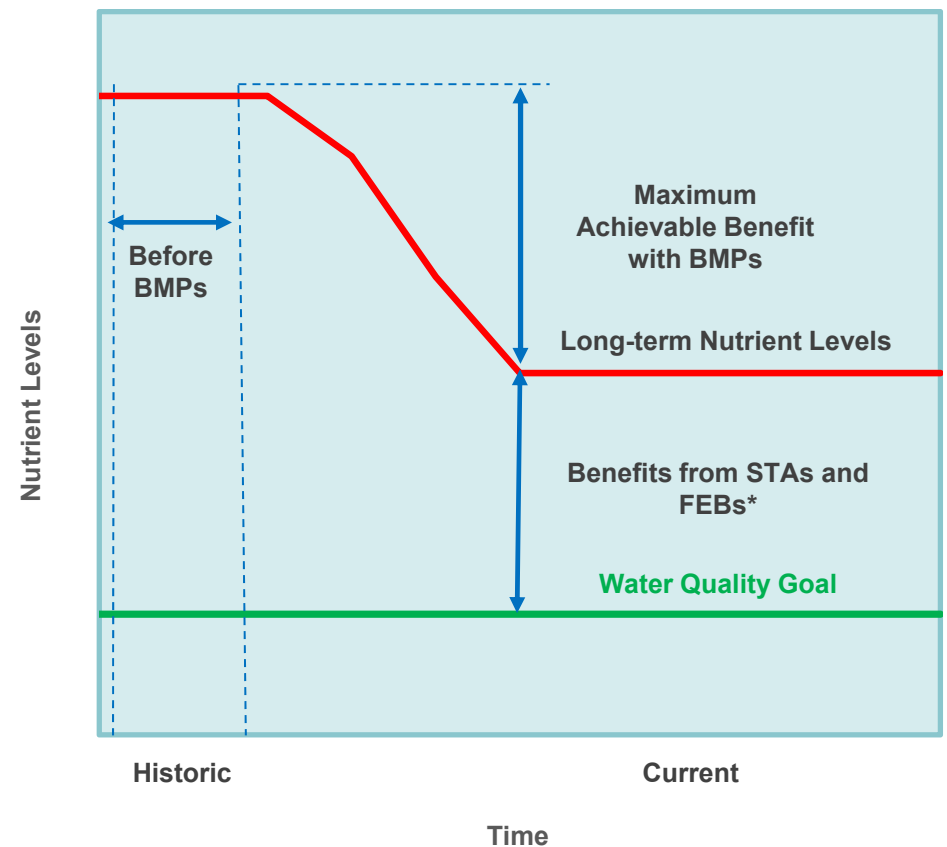
- Major Tributaries
- 640,000 acres total
 - EAA 470,000 acres
 - C-139 170,000 acres
- Sugarcane, vegetables, rice, sod, cattle



Best Management Practices (BMPs)

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- **Minimize Transport of Phosphorus in Off-Site Discharges**
- **Improved Farming Techniques**
 - Control Phosphorus Inputs
 - Optimize On-Site Storage of Stormwater
- **Cost Effective Measures**
- **Maximum Achievable Water Quality Benefit**



*Stormwater Treatment Areas
and Flow Equalization Basins



Comprehensive Best Management Practices Plans

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Dissolved P
Nutrient Management



Fertilizer spill prevention



Fertilizer in root zone



Restricted Placement of Feeders

Particulate P
Particulate Matter and Sediment Control



Systematic canal/ditch cleaning



Barrier upstream of structure



Forage Growth

Discharge Volume
Water Management



Rain Gauge



Control structure



Staff Gauge



Best Management Practices Program Major Components

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- Comprehensive Best Management Practices Plans
- Verification of Implementation
 - *Field Observations*
 - *Reporting*
- Water Quality Monitoring Network
- Performance Measures for P Load
 - *EAA 25% Phosphorus Reduction versus Historic Levels*
 - *C-139 Maintain Historic Levels*



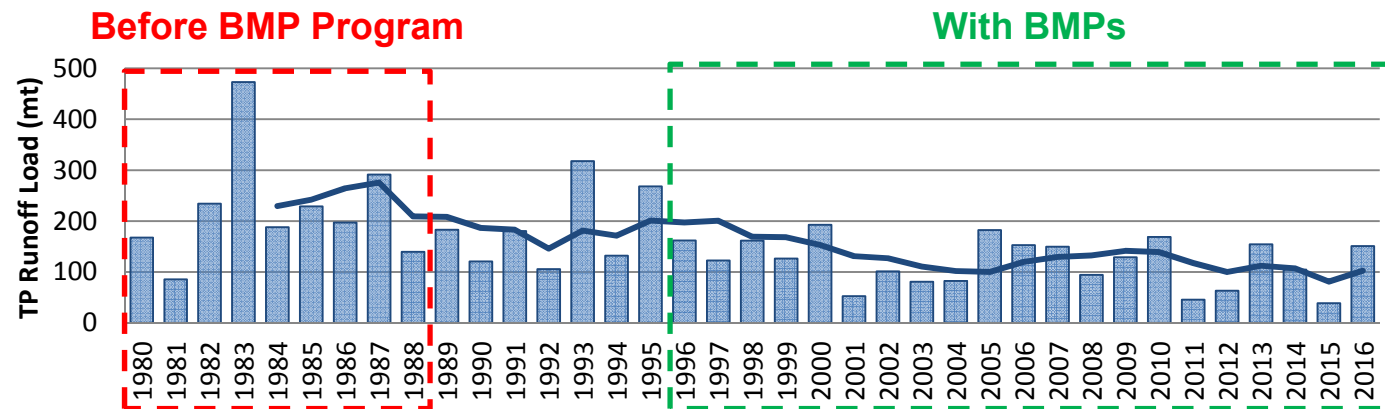
SFWMD staff verifying water management detention BMP at EAA Farm



Assessment of Program Performance

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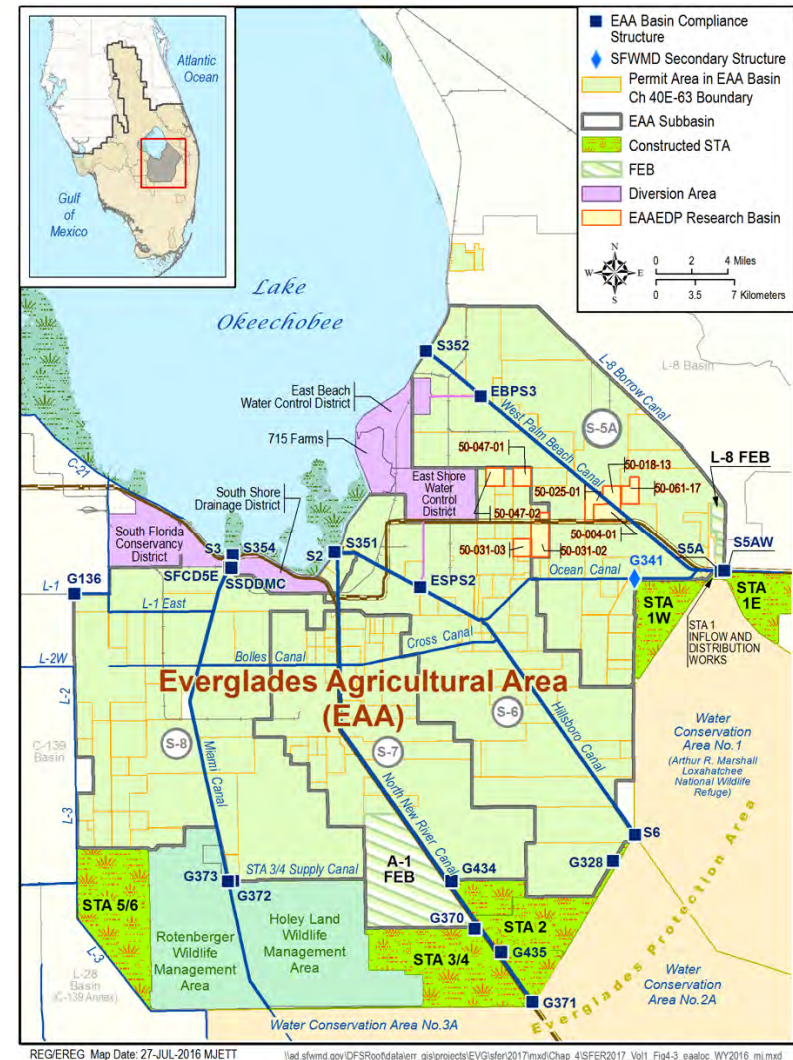
- Compare Phosphorus Loads for Current Year With BMPs to Period Before BMP Program
- Results must be Consistently Achievable over the Long-Term
- Variability is Expected Year-to-Year
 - Basin-Wide Phosphorus Loads
 - Rainfall Adjustment for Intensity and Distribution



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With BMPs

- **Measured Phosphorus Loads**
- **Phosphorus & Flow Data Collected at Points to and from each Basin**
- **Rainfall Data**





Base Period Phosphorus Loads

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Base Period Water Years 1980-1988 Before BMP Program

- **Mathematical Model Adopted by Rule**
- **Estimated P Loads**
- **Base Period's P Loads Adjusted Using the Current Water Year's Rainfall**
- **Apples-to-Apples Comparison**

Total Water Year Rainfall (inches)	Monthly Rainfall Variability	
	Coefficient of Variation	Coefficient of Skewness
53.5	0.6	1.4
35.1	0.7	0.3
46.7	0.9	1.8
64.4	0.7	0.3
49.8	0.7	0.4
39.7	0.8	0.2
51.2	0.7	0.5
52.0	0.8	1.1
43.4	0.6	0.6



Annual Comparison

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**Water Year 2016
With BMPs**

**Measured
Phosphorus
Load**

Compared To

**Base Period
Before BMP Program**

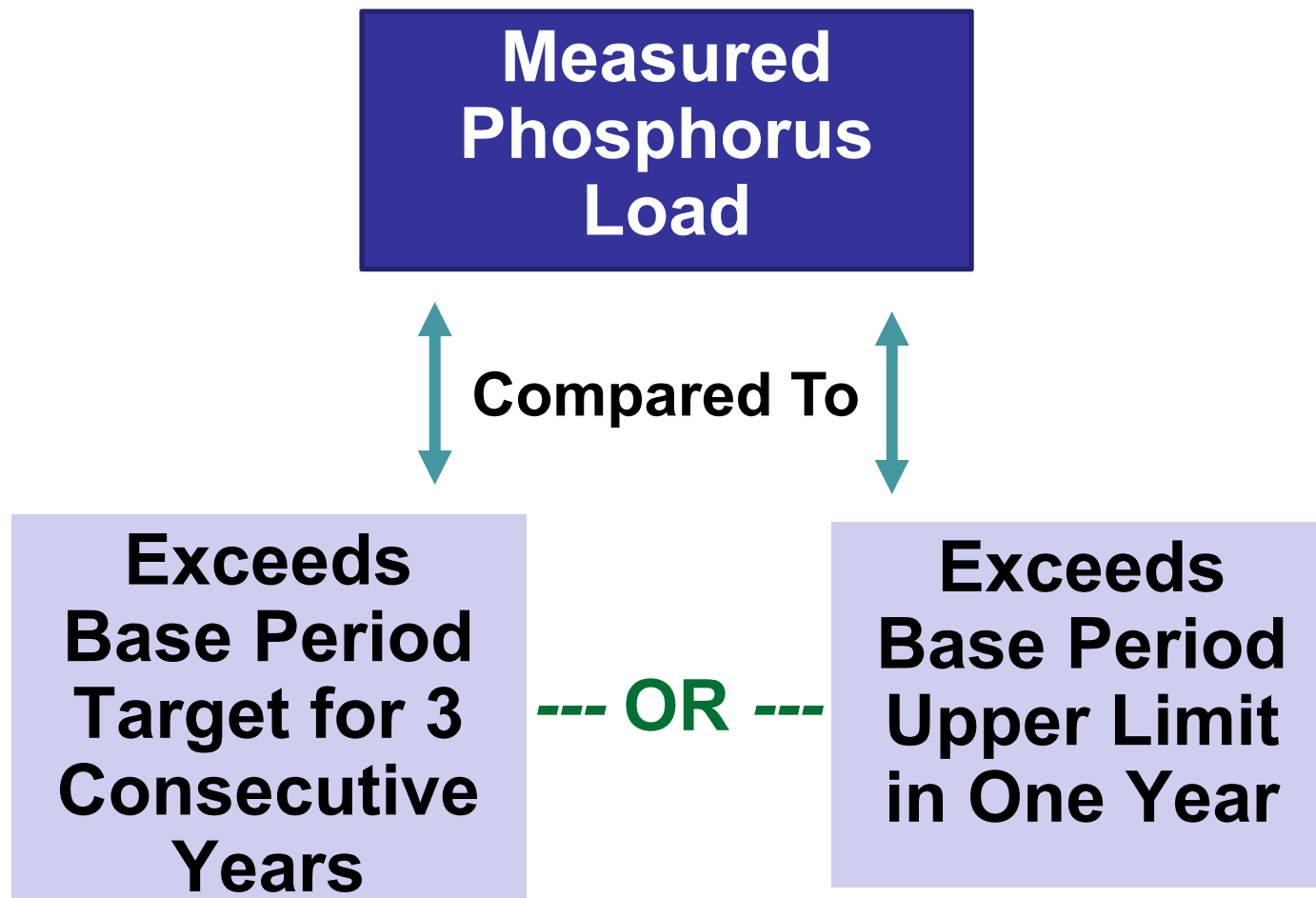
**Estimated
Phosphorus Load
with Rainfall
Adjustment**



Compliance Determination

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Two-Pronged Compliance Test



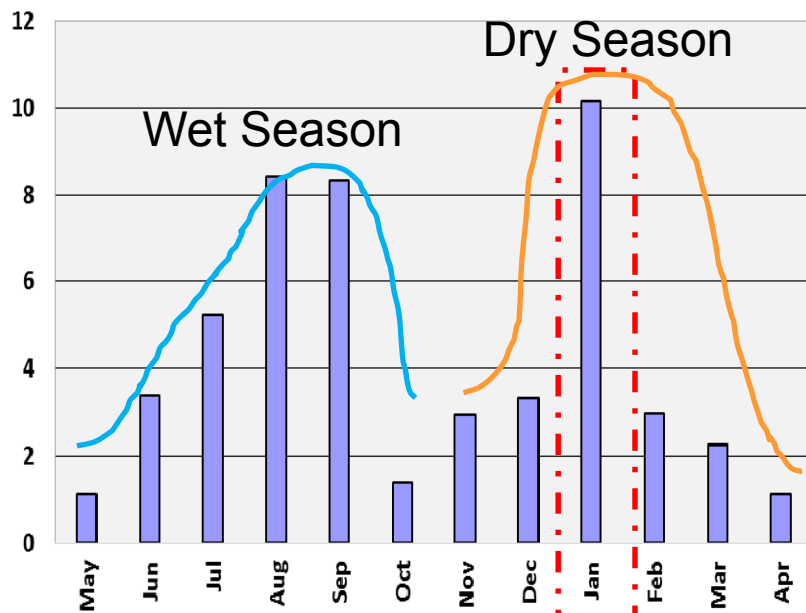


Everglades Agricultural Area Rainfall

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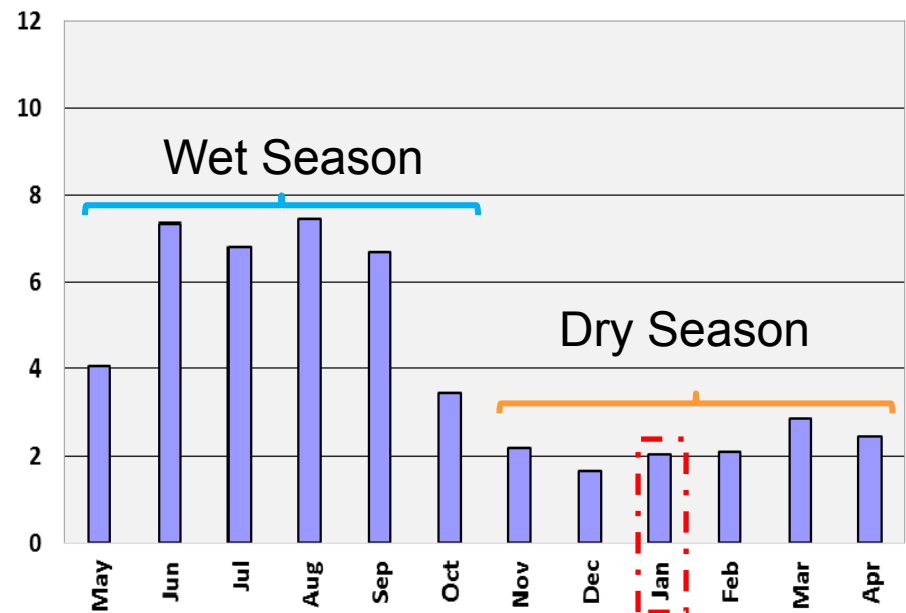
WY2016

**Average Total Annual
Rainfall 50.6 inches**



WY1980-2016

**Average Total Annual
Rainfall 49.1 inches**



10 inches versus 2 inches



Unprecedented Rainfall

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- **January 2016 Wettest January on Record**
- **During Peak Winter Growing Season**
- **Governor-Declared State of Emergency**



Flooding after unprecedented January rainfall



WY2016 EAA Basin Performance

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EAA Basin In Compliance

Goal: 25 percent reduction

Achieved: 27 percent reduction



EAA farms near Lake Okeechobee

WY2016 discharge	➡	151 mtons
Base Period Target	➡	154 mtons
Base Period Limit	➡	206 mtons

21-year Average 55% Phosphorus Load Reduction with BMPs

BMPs have prevented **3,055 mtons** of Phosphorus from leaving the EAA



WY2016 C-139 Basin Performance

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C-139 Basin In Compliance

Goal: Maintain Historic Loads
Goal Achieved



*Surface water impoundment
in C-139 basin*

WY2016 Discharge	➡	43 mtons
Base Period Target	➡	33 mtons
Base Period Limit	➡	80 mtons



Best Management Practices Program Success

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- **Consistently Meeting Water Quality Requirements over the Long-term**
- **Verification of Performance**
 - **BMP Implementation Verification**
 - **Water Quality Monitoring Results**
- **Compliance with the EFA and Federal Order**
- **Cooperative Partnership with Permittees**
- **South Florida Environmental Report, Volume I, Chapter 4**



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Questions?